



All About Auctions

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Electronic Simultaneous Multiple . . . What ?! Auctions Explained

The Commission's auctions of electromagnetic spectrum assign licenses using a unique auction methodology called "electronic simultaneous multiple-round auctions". A simultaneous multiple-round auction is similar to a traditional auction, except that, rather than selling licenses one at a time, a large set of related licenses are auctioned simultaneously and bidders can bid on any license offered. The auction closes when all bidding activity has stopped on all licenses.

The following discussion summarizes the alternative competitive bidding designs the Commission explored when developing its auction methodology, and demonstrates the advantages of simultaneous multiple round auctions. There are several auction design elements which, in combination, produce many different auction types. The two most important elements are: (a) the number of auction rounds (single or multiple); and (b) the order in which licenses are auctioned (sequentially or simultaneously).



Single versus Multiple Round Bidding

Auctions may have single or multiple bidding rounds. Single round auctions are often referred to as sealed bid auctions. In a single round auction, bidders may place only one bid for an item and the item is awarded to the high bidder. In multiple round auctions however, bidders have the opportunity to top the high bids from the previous round. A common form of a multiple round auction is the oral auction, also known as an open outcry or English auction in which bids are submitted orally in an auction hall. Most people are familiar with this type of auction that is used to sell anything from antiques to cattle.

The principal advantage of a multiple round auction for assigning spectrum is the information that it provides bidders about the value other bidders place on a license. This information increases the likelihood that licenses will be assigned to the bidders that value them the most and will generally yield more revenue than auctions where there is much uncertainty about common factors that affect the

value of a license to all bidders, i.e., who bid and how much was bid. In a single round (or sealed bid) auction, bidders must guess about the value that other bidders place on a license, thus, the party who values the license most highly may guess wrong and not submit the highest bid. In a multiple round auction, bidders need not guess about the value the second highest bidder places on the license because bidders have the opportunity to raise their bids if they are willing to pay more than the current high bidder. Multiple round bidding is also more likely than single round bidding to be perceived by participants and observers as open and fair. No bidder can realistically argue that it did not have the opportunity to obtain a license if it was willing to pay enough.

Auction theory shows that multiple round bidding tends to increase revenue by reducing the incentive for bidders to be overly cautious during bidding while trying to avoid the winner's curse—meaning the highest bidder would bid too much and regret its purchase. Multiple round bidding provides information about other bidders' estimates of common information thus reducing bidders' incentive to bid cautiously so as to avoid falling victim to the winner's curse and regretting their purchases.

Sequential versus Simultaneous Bidding

The magnitude of the advantages of simultaneous multiple round bidding depends on the degree of interdependence among licenses. Licenses are interdependent either because they are substitutes or because they are complements. With substitutes, the lower the price of one license, the less a bidder would be willing to pay for another. Perfect substitutes are highly interdependent because the price of one puts an absolute cap on the amount a bidder is willing to pay for another. If, for example, license A or B are perfect substitutes and a bidder knew that license A could be purchased for \$100, that bidder would be willing to pay no more than \$100 for license B. With complementary licenses, on the other hand, the lower the price of one, the more a bidder would be willing to pay for another. One way to think about complementary licenses is that they are worth more

as part of a package than individually. Often when bidders use this complementary strategy, it is known as the aggregation of licenses.

The greater efficiency of simultaneous multiple round auctions in awarding interdependent licenses follows in part from the fact that they reduce the need for bidders to guess about outcomes in later auction rounds. With sequential auctions, bidders in initial rounds must guess about prices in later rounds. A bidder may pay a lot for a license in an early round on the mistaken expectation of a low price for a complementary license (or a high price for a substitute) in a later round. Alternatively, a bidder may bid very little for a license in an early round in the hope that a close substitute will sell for less in a later round. Either situation could result in award of licenses to those who do not value them the most. By providing more information to bidders about the value of interdependent license, simultaneous auctions are also likely to raise more revenues by alleviating the winner's curse and making a more successful auction program.

Auctions Automation --

Flexible and Responsive

For years the Federal Government used auctions to dispose of foreclosed properties, furniture, equipment, and other government-owned assets. These auctions were conducted manually either through sealed bid or oral outcry auction methodologies. When the Commission began to design auctions for the airwaves, it became apparent that manual auction methods could not adequately allocate large numbers of licenses where thousands of interdependent licenses were being auctioned to hundreds of bidders at the same time. The solution – The FCC Automated Auction System (“AAS”).

The AAS provides the necessary tools to conduct efficient auctions. Using it, the Commission can process tens of thousands of bids by hundreds of bidders on thousands of licenses. The system accommodates the needs of bidders by allowing them to bid from their offices using a personal computer and a modem through a private and secure wide area network (“WAN”). The system can also accommodate on-site bidders and telephonic bidding. It manages both the administrative and technical aspects of the auction process with day-to-day

FCC Login

**FCC AUCTION BIDDING
MODULE** VERSION 4.3

Auction ID: 18

Login ID: 12345678

Password: *****

FCC Account Num: 87654321

Bidder Identification Number (BIN): *****

Ok Close

?

Federal Communications Commission

operations that are simple and straightforward. This comprehensive software system provides the Commission with the ability to track auction participants from their initial inquiry through the auction bidding process.

The Wireless Telecommunications Bureau built the system from the ground up using a unique combination of innovative solutions to meet the complex requirement of the auctions program. State-of-the-art information technology was used including hardware, software, and telecommunications solutions in a client/server environment.

To do this, the Commission brought together the talents of economists, industry analysts, game theorists, programmers, and lawyers to formalize the requirements of the system. Auctions for different types of communications services have necessitated using very different auction rules. The auctions system, therefore, is designed to be flexible to administer different types of auctions and adapt to changes in the auction rules. In addition, a solid database design was critical to the overall success of this system, with special consideration given to providing data integrity and high performance. The

technical challenges posed by the design requirements were significant, and great care was taken to create a flexible, parameter-driven system powerful enough to adapt to a changing environment.

The Commission's simultaneous multiple-round auction methodology and the AAS design have produced worldwide interest. The Commission has demonstrated the system to representatives of many different countries including Argentina, Brazil, Canada, Hungary, Peru, Russia, South Africa and Vietnam. Mexico licensed the Commission's copyrighted system and has used it successfully in a spectrum auction. In addition, in 1997, the Commission was awarded a bronze medal from the Smithsonian Institution for recognition of the visionary use of information technology and had a copy of the software sealed in a time capsule.

As with any automated product, requirements change. The AAS is designed to meet these challenges. For example, future releases of the auction system will allow simultaneous auctions of tens of thousands of license concurrently, and will interface with a newly designed licensing system.

Remaining time for round 73 to close is 00:17:42

Auction: 18-Phase II 220 MHz Service Stage: 3 Round: 73 Waivers Remaining: 5 Waivers Used: 0

Bidders: Ima Bidder FCC Account Num: 87654321 Fax: (123)456-7899

Options	Market /Freq	Bid-Units	High Bidder	High Bid Amt	Bid Increment	Bid Mult	Bid Amount
Withdraw High Bids	BEA158-A	Phoenix-Mesa, IL 2,500	0181507149	9,200.	500.	1	.
Remove Current Bids	BEA158-B	2,500	0181648029	10,000.	1,000.	0	.
Set Groups							
Refresh							
Export							
Import							
Find							
Print Screen							
Sort							
Bid Verification							
Close							

Activity: 2,500. Total: \$0.

Group Number: 1 Submit

Maximum Eligibility Amt: 2,552. Activity Amt Required: 2,500.

Tracking the FCC's Auctions

The Commission has worked very hard to ensure that bidders and other interested parties are able to track the progress of the auctions, and access data in a fast and efficient manner. In addition to the summary charts on the FCC's web site, and the raw data placed on the FCC's web site, wide area network, and bulletin board, the Commission has developed two additional methods for the public to track the progress of the auctions.

The FCC's Auction Tracking Tool

The FCC Auction Tracking Tool ("ATT") is a stand alone application that allows a user to track detailed information on an auction. During an auction, the FCC releases round result files after every round with details on all of the activity that occurred in that round. Users can use the ATT to

import these round result files into a master database file and then view a number of different tables containing a large amount of data in a spreadsheet-like view. Users can sort, filter, and develop complex queries from the tables to track the activity of an auction in virtually any way they desire. There are also ready-made tables containing simple summary data to allow more casual observers to track the progress of the auction in general.

The ATT and the round result files for a particular auction will generally be available on the FCC Auctions web site. Go to that site, <http://www.fcc.gov/wtb/auctions/>, and use the links provided to navigate to the auction you are interested in. The auction page will provide a link for the Auction Tracking Tool as well as the round result files.

FCC Auction Tracking Tool - C:\Program Files\FCC Auction Tracking Tool\Auction22.mdb - [All Bids - ...]

File View Tools Window Help

Table: All Bids Round: 9

	Auction ID	Round	License	Market	Block	Submarket	Bidder	Increments	Gross Bid	N
1	22	9	PBB001C	BTA001	C		VMN Conso	1	\$26,000.00	\$1
2	22	9	PBB002C2	BTA002	C		ABC Wireles	1	\$15,000.00	\$1
3	22	9	PBB003C2	BTA003	C		C.T. Cube, In	1	\$265,000.00	\$22
4	22	9	PBB008C2	BTA008	C		Beta Commu	1	2,960,000.00	2,22
5	22	9	PBB013C	BTA013	C		ABC Wireles	1	1,556,000.00	1,16
6	22	9	PBB026C	BTA026	C		ABC Wireles	1	\$719,000.00	\$53
7	22	9	PBB032C	BTA032	C		Viper Wireles	1	2,715,000.00	2,03
8	22	9	PBB058C2	BTA058	C		ABC Wireles	1	\$106,000.00	\$7
9	22	9	CWB060E	BTA060	E		MCG PCS, I	1	\$604,000.00	\$60
10	22	9	PBB068C	BTA068	C		Beta Commu	1	\$54,000.00	\$4
11	22	9	PBB073C2	BTA073	C		CFW Commu	1	\$218,000.00	\$21
12	22	9	PBB101C	BTA101	C		ABC Wireles	1	2,568,000.00	5,92
13	22	9	PBB101C	BTA101	C		OPCS Three	1	2,568,000.00	3,18
14	22	9	PBB118C	BTA118	C		ABC Wireles	1	\$337,000.00	\$25
15	22	9	PBB137C	BTA137	C		CFW Commu	1	\$29,000.00	\$2
16	22	9	PBB146C2	BTA146	C		North Alabar	1	\$82,000.00	\$6
17	22	9	PBB162C2	BTA162	C		Beta Commu	1	\$56,000.00	\$4
18	22	9	PBB168C	BTA168	C		Glenn W. Ish	1	\$269,000.00	\$20
19	22	9	PBB169C2	BTA169	C		Leap Wireles	1	\$756,694.00	\$56

All Bids - Round 9 4/23/99 NUM

Maps of Auction Results

The FCC also provides the capability to plot maps of auction winners, high bidders by round and more general auction activity. Through the Auctions Geographical Information System (GIS), interested parties can use a Web browser-based application to construct queries against the database for a particular auction and have the results displayed in a map format. The GIS presents its query results primarily in maps which the user can export to easily transportable graphical formats, and provides the user the ability to display data in tabular format.

Currently, there are 3 queries that can be executed against any closed or open auction in the GIS:

- Market Analysis by Number of Bids
- Round Results Summary
- Bidder Activity

The Market Analysis by Number of Bids query allows users to see which licenses received a bid in a given round and how many bids each market received. The Round Results Summary query provides a high-level summary of activity for the selected round, depicting markets for which a new high bid was received, markets for which a bid was withdrawn, and markets that had no new activity. The Bidder Activity query allows users to query the database to generate a map showing all of the licenses for which a particular has a high bid in a given round.

FCC Auction - Netscape

File Edit View Go Communicator Help

Bookmarks Netsite: <http://www.fcc.gov/wtb/auctions/>

What's Related

Circular area of operation
By STATES
Frequency Range: 928.00 - 929.00 MHz
zoom width: 2946.75 mile(s)

Zoom In Zoom Factor: 2.0
Zoom Out
Drill Down
Recenter

This data last updated 4/17/1999

Mapped Licenses:

Callsign	Licensee	City	State
WAH763	ATLANTA, CITY OF	BALTIMORE	MD
WBM401	WESTEC RESIDENTIAL SECURITY INC.	SANTA MONICA	CA
WBM574	LA ROCHE CHEMICALS, INC.	GRAMERCY	LA
WCE260	JOHN MITCHELL CO.	CHATS WORTH	CA
WCF205	ENTERPRISE PRODUCTS COMPANY	SORRENTO	LA

Back GIS Home Select New License Query Help

Auctions

- In Progress Auctions
- Future Auctions
- Completed Auctions
- Auction Related Maps

In Progress

- 220 MHz Auction #11
- 220 MHz Auction #12
- 220 MHz Auction #13
- 220 MHz Auction #14
- 220 MHz Auction #15
- 220 MHz Auction #16
- 220 MHz Auction #17
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Countdown to Auction

The rule making is only one of many steps on the path from allocation to licensing by auction. What follows is a condensed chronological summary of the pre-auction phase and the approximate timing of each step.

180 - 120 Days: First Announcement.

The Commission conducts and releases a rulemaking identifying spectrum to be auctioned. Generally this is the first time the Commission alerts the industry of an upcoming auction. The industry needs notice to have adequate time to raise capital, assess market conditions, and evaluate the availability of equipment.

Auction Team Established. A multi-disciplined team is established for each spectrum auction including a project manager, attorneys, an economist, an analyst, and other personnel. The Auction team is required to complete several milestones during this period, including completing and incorporating automation initiatives; assessing spectrum and incumbency; and assessing and determining estimates for upfront payments, minimum opening bids, and/or reserve prices.

Ask for Comment. The Wireless Telecommunications Bureau releases a Public Notice seeking comment on the auction activity rules, upfront payment amounts, minimum opening bids and/or reserves. This is in accordance with requirements of the Budget Act of 1997.

90 Days: Announce Terms and Conditions. The Wireless

Telecommunications Bureau releases a Public Notice providing potential participants with the procedures, terms, and conditions for the auction event.

45 Days: Seminar. A pre-auction seminar is conducted for potential participants.

30 Days: Short Form Filing Deadline (FCC Form 175). This is the first deadline faced by potential participants. This form captures basic information regarding the applicant's ownership structure and identifies the markets/licenses on which they intend to bid during the auction. Applicants must file this form electronically.

21 Days: Filing Status Public Notice Released. After the deadline for filing has been reached, staff reviews all timely-filed short forms and deems applications accepted, incomplete, or rejected. The status of the applications is communicated to the public through the release of the Filing Status Public Notice.

Upon completion of the Public Notice, an overnight package is sent to all applicants with the Public Notice enclosed. For applicants whose filings have been deemed incomplete, a letter is included which explains the reasons for the incomplete designation and includes the name of an FCC contact person if further explanation is required.

14 Days: Upfront Payment Deadline. Approximately two weeks after the filing

deadline and two weeks before the start of the auction, potential bidders must submit a refundable deposit that is used to purchase the bidding units required to place bids in the auction.

Resubmission deadline for Short Form Filings. FCC Form 175 short form applications which were deemed “incomplete” must be refiled by this deadline, which is often concurrent with the upfront payment deadline.

10-12 Days: Qualified Bidders Public Notice Released. The qualified bidder public notice lists the bidders qualified to participate in the auction, their FCC Account Number, their bidding unit eligibility, and the markets selected on their FCC Form 175. In addition, the Public Notice contains information regarding the mock auction, the number and length of the bidding rounds for the first day of the auction, and any other auction-specific information which must be communicated prior to auction commencement.

Qualified Bidders Registration. Immediately following the release of the Qualified Bidders Public Notice, the registration process begins. Two overnight mailings are sent to the contact person identified on the short form application. These mailings include confidential bidding access codes, Automated Auction System Software and manual (if purchased), qualified bidders public notice, telephonic bidding phone number, and any other documents necessary to participate in the auction.

5 Days: Mock Auction. As a service to the qualified bidders, the FCC sponsors a mock auction. The mock auction allows bidders to work with the software, become comfortable with the rules and the conduct of a simultaneous multiple-round auction, and familiarize themselves with the telephonic bidding process.

Day 0: Auction Event.

Let's Talk Auctions

The list below provides definitions of common terms used during simultaneous multiple-round auctions.

Activity: A general reference regarding the level of bidder participation in an auction.

Activity Rules: To ensure that an auction closes within a reasonable period of time and to increase the information conveyed by bid prices during the auction, the Commission utilizes “activity rules” which prevent bidders from waiting until the end of the auction before participating. Bidders are required to bid actively or be active (have a standing high bid) on a certain percentage of their bidding units (acquired by a bidder placing an upfront payment prior to the auction) in every round. The required level of activity increases in each stage of the auction.

Bidding Credit: A percentage discount applied to the high bid amount for a license if the bidder meets specific designated entity criteria established in the auction rules. Bidders must apply for bidding credits when they file the FCC Form 175.

Bid Increment: An FCC-determined minimum amount by which a bidder must increase a standing high bid. The bid increment is a fundamental activity rule that regulates the pace of an auction. Without a bid increment, bidders could increase bids by nominal amounts (such as \$1.00 over the previous high bid), thereby increasing the time required for a license to reach its final value. Increments are generally calculated as a percentage of the standing high bid. The Commission has employed a formula known as “exponential smoothing” to calculate the increment.

Bidding Units (BUs): A unit of measure assigned to the licenses being auctioned and used to report a bidders’ eligibility level. Prior to an auction, licenses are assigned a specific number of bidding units. In order to place a bid on a license, a bidder must have a number of “inactive” bidding units greater than or equal to the number of bidding units associated with that license. Bidders acquire bidding units by submitting an upfront payment prior to the start of an auction. Typically each dollar of an upfront payment will garner 1 bidding unit for a bidder to use in the auction.

Bid Withdrawal: Withdrawal of a standing high bid by the high bidder during the course of an ongoing auction. Bid withdrawals are subject to a withdrawal payment if the license ultimately sells for less than the withdrawn bid amount. The bid withdrawal rule serves as an enforcement mechanism for insincere bidding, and as a means of allowing bidders to change strategies during the course of an auction.

Eligibility Ratio: The ratio of total bidding units held by all bidders to the total bidding units for all license in the auction. The eligibility ratio is useful as a general measure of the competitiveness of an auction. In past auctions, the ratio has varied from over 7 to 1 to 1.5 to 1.

Exponential Smoothing: This formula determines the bid increment for each license on a weighted average of the activity on that license in the most recently completed round and the activity on the license in all previous rounds. The exponential smoothing methodology will vary the bid increment between a minimum and a maximum (e.g., 10-20%) amount based on the

level of bidding activity on that license. Licenses receiving more bidding activity will therefore be assigned higher bid increments.

FCC-Held Licenses: A license is listed as “FCC held” because either no bid has yet been placed on the license, or because a high bid has been withdrawn and no bidder has placed a subsequent bid on the license.

Maximum Eligibility: The total number of bidding units a bidder is eligible to use in a single round. A bidder’s maximum eligibility is initially established by the amount of its upfront payment. A bidder’s eligibility level limits the licenses on which a bidder may place bids.

Minimum Acceptable Bid: Once there is a standing high bid on a license, a bid increment will be applied to that license to establish a minimum acceptable bid for the following round.

Net High Bid: The current high bid, adjusted by the percentage of a high bidder’s bidding credits.

Net Revenue: The total net high bids for all licenses in the auction.

Pop: Abbreviated term for population. One “pop” equals one person. The Commission currently uses 1990 census data as a measure of population.

Round: An auction round consists of a bidding period and a round results period.

Simultaneous Stopping Rule: An activity rule which states that an auction will close only after a round in which no new bids, withdrawals, or proactive waivers are received. The FCC retains the discretion to keep and

auction open even if no new acceptable bids and no proactive waivers are submitted as specified in the auction rules.

Stages: Typically, an FCC simultaneous multiple round auction employs an activity rule which divides the auction into three stages. Each stage requires bidders to be active on an increasing percentage of their maximum eligibility (as measured in bidding units) in order to maintain their current maximum eligibility level (e.g., Stage I, 80% of their bidding units; Stage II, 90-% and Stage III, 98%). In a given stage, if a bidder’s activity falls below the required level, an automatic waiver will be submitted on the bidder’s behalf if the bidder has waivers remaining. If a bidder has no waivers remaining, its eligibility will be permanently reduced to bring it into compliance with the activity rule.

Stage Transition Percentage: A percentage calculated by dividing the total number of bidding units of licenses receiving high bids in the current round by the total number of bidding units for all licenses in the auction. Named the “Stage Transition Percentage” because this percentage is an important factor in determining when an auction transitions to a subsequent stage.

Waiver (Activity Rule Waiver): Each bidder is provided a predetermined number of waivers at the start of an auction (e.g., five). Each waiver can be used during any bidding period to preserve a bidder’s eligibility despite having an activity level at the close of the round that is below the required minimum. A waiver applies to an entire bidding round.

Proactive Waiver: A waiver submitted by the bidder during the bidding period. A proactive waiver (1) will preserve a bidder’s eligibility in a round when the bidder does not meet the activity requirement, and (2) will keep the auction open in the event that no bids are placed in the round in which the proactive waiver is placed. Bidders who do not wish to place a bid in the current round while maintaining their maximum eligibility level and ensuring the auction does not close for lack of activity under the simultaneous stopping rule should consider placing a proactive waiver.

Automatic Waiver: A waiver applied automatically by the bidding system if a round closes and a bidder is below the required activity level. An automatic waiver will not keep the auction open in the event that no bids or proactive waivers are submitted during the bidding period.